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### REMARKS

Claims 1-57, all the claims pending in the application, stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion.

#### **I. The Prior Art Rejections**

Claims 1-57 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Palmer, et al. (U.S. Patent No. 6,990,628 B1), hereinafter referred to as "Palmer" in view of Woo (U.S. Patent No. 7,039,641 B2). Applicants respectfully traverse these rejections based on the following discussion.

Page 10 of the Office Action states that "the claim language does not take into account" the user query. However, the Applicants have never stated that this language has been recited in the claims. Rather, the Applicants have claimed "classifiers are operable to retrieve documents from said database based solely on whether said documents are relevant to said query input." The Office Action states that col. 4, lines 14-19 of Palmer teaches this. However, FIG. 1 of Palmer indicates an opposite teaching.

In FIG. 1 of Palmer, various types of information such as hyperlink information, text similarity, multimedia component similarity, URL similarity, click-through information, and cache hit log similarity are combined together to create a similarity objective function, which is then used to compare two documents in order to create generalized similarity values among the two documents. Thus, in Palmer the pages are retrieved first and then associated a similarity value and then, as indicated in col. 11, lines 36-40 of Palmer, "the generalized similarity value 120 is used to determine the proper category, among a taxonomy of categories in an index, cache

or search system, into which documents 112, 114 belong.” This indicates that the similarity value is used for classification purposes; i.e., how to group the documents. Conversely, in the Applicants’ claimed invention, no such classification takes place, rather documents are retrieved based solely on whether they are relevant to the query input. In Palmer, FIG. 1 and the associated text indicates that documents are retrieved based on many factors, some not necessarily related to relevancy to a particular query input, and are compared with other documents to determine a classification of the documents. Moreover, col. 5, lines 41-45 of Palmer teach finding dissimilar documents, “to find dissimilar documents, only the documents in the most dissimilar categories are compared. As a result, the most similar and the most dissimilar pairs of documents tend to be obtained. For these pairs, positively weighted or negatively weighted text links are created and stored.” This teaches away from the Applicants’ claimed “classifiers are operable to retrieve documents from said database based solely on whether said documents are relevant to said query input.” Accordingly, Palmer teaches away from the Applicants’ claimed invention.

Additionally, as previously mentioned, and to reiterate, Palmer deals with similarities between documents, using specific features such as URLs. Palmer uses a training algorithm to iteratively maximize an objective function of the similarity matrix. Therefore, Palmer requires that the amount of calculation and storage be proportional to the square of the number of documents. Conversely, the Applicants’ invention uses feature vectors only (i.e., solely) instead of matrices, which require only resources to be proportional to the number of documents. Moreover, Palmer’s classification of documents is performed independent of a specific query. For example, in Palmer the classification occurs, in part, based on the time spent by a user

browsing various documents (column 10, lines 15-34). Conversely, the Applicants' invention only performs its classification to determine whether documents are relevant to a specific topic, ignoring their similarities in all other aspects not relevant to the query.

Additionally, Palmer calculates a weight matrix describing similarity information  $w(i,j)$  for each pair of documents  $i$  and  $j$  (column 12, lines 18-19). This is calculated from a number of relationships between these two documents (column 4, line 27 to column 10, line 51). This calculation is performed beforehand, independent of user queries (column 2, lines 64-68, and column 3, lines 1-3). In contrast, the Applicants' invention only uses the rate of success of relevance (i.e., matching) of each document to the specific topic of the user query. Accordingly, the Applicants' invention does not have to calculate the similarity between each pair of documents. In other words, Palmer's invention does not take into account the user query, and it requires the availability, calculation, and storage of pairwise information, which is not applicable in the Applicants' invention. Conversely, the Applicants' invention does not make use of pairwise information even when it is available.

The work of Woo deals with packet filters for network traffic where a large number of simple filters are employed to process a large number of packets at a very fast rate. These filters perform very simple binary decisions. The emphasis in Woo is on getting through as many filters as possible by by-passing branches of the decision tree. The applicability of Woo's invention relies on the fact each filter can make deterministic binary decisions. Woo also talks about weights (column 5, lines 53-67), however the values calculated from these weights are again used to shape the decision tree (columns 11 and 12); i.e., by-passing branches on the decision tree.

In contrast, the Applicants' claimed invention propagates probability (feature) vectors from one classifier (filter) to another (i.e., "each layer of the cascade of classifiers is trained in succession from a previous layer by the expectation maximization methodology, wherein the output distribution is used as an input distribution for a succeeding layer."). Moreover, in Woo results are thresholded to zero or one (i.e., according to claim 5 of Woo "each non-leaf node has two child nodes, one said child node representing a set of filters having a 0 or \* bit at the bit position corresponding to the non-leaf node, and the other said child node representing a set of filters having a 1 or \* bit at the bit position corresponding to the non-leaf node."). Conversely, in the Applicants' invention, results calculated from each classifier layer are not thresholded to zero or one. Accordingly, Woo teaches away from the Applicants' claimed invention.

Furthermore, one of the applications for the Applicants' invention is in text analytics, where it is known to those skilled in the art that the thresholding of the results or by-passing of the layers most often degrades the quality of the result. Accordingly, the Applicants' claimed invention is patentably distinct from Woo (in combination with Palmer).

The work of Woo is in a completely different field (i.e., packet filtering in network traffic) from either the Applicants' invention or Palmer's invention (i.e., text information extraction). On the one hand, in Woo the packets arrive in an endless time sequence, and have to be disposed of quickly, independent of each other (column 1, lines 38-47). Neither Palmer's invention nor the Applicants' invention are applicable to this field, since both require an iterative calculation on a fixed large collection of documents. On the other hand, Woo's invention assumes that the filter rules are all fixed beforehand (column 17, lines 44 - 46). Therefore it is not applicable to text information retrieval, where it is important to learn the filter rules (weight

matrix in Palmer's invention and feature vectors in the Applicants' invention). Woo's invention bypasses a large number of filters yet still provides an answer as if all the filters have been consulted (column 1, line 66 to column 2, line 2). This is only possible if all the filters make yes-no decisions; conversely in the Applicants' invention the classifiers in text information retrieval keep weights or probabilities which are not zero or one. Since Woo's invention solves problems completely different from the problems solved by either Palmer or the Applicants, the above contrast is made only approximately, assuming that packets correspond to documents and filters correspond to classifiers, as implicated by the last paragraph of page 3 of the Office Action. In reality, packets are very simple and well-defined entities (see Woo, column 1, lines 26-32), while texts are complex and unstructured (see Palmer, column 4, line 27 to column 10, line 51). Accordingly, Woo in combination with Palmer would result in an inoperable device/method producing conflicting results.

The comments on page 5 of the Office Action regarding Applicants' claims 2, 21, 40, 3, 22, and 41 suggests that Woo's invention deals with "input distribution" and "output distribution", but there are no such concepts in Woo in the columns/lines cited. Instead, Woo only deals with "input tuples" and "output tuples", which those skilled in the art would readily understand are binary numbers. In contrast, a "distribution" in the context of the Applicants' invention is not a single tuple, but an assignment of probabilities to all possible such tuples (see Applicants' specification, page 13, lines 14-17; page 14, lines 9-21; page 15, lines 13-19). Accordingly, as the MPEP suggests, the Applicants may be their own lexicographers (MPEP §2111.01(III)), and as such the Applicants' claimed language should be read in light of the definitions and descriptions provided in the Applicants' specification.

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Furthermore, the comment on pages 6-8 of the Office Action suggests that Woo's invention discloses an "expectation maximization methodology that maximizes a likelihood of a joint distribution of said training data points and latent variables". The term "expectation maximization methodology" in the Applicants' invention refers to a specific statistical procedure that is applicable to systems with a specific kind of statistical models (a latent variable model is one of them). There is nothing in Woo (column 9, lines 16-21) that remotely relates to any of this. The following terms are technical terminology related to statistical models: expectation maximization algorithm (or methodology), likelihood, joint distribution, latent variables. However, these terms do not apply to Woo's setting where a statistical model is absent. There is no basis in either Woo or in any other prior art reference or by the vernacular used those skilled in the art that uses "minimize duplication" and "maximize balancedness" to be analogous to an "expectation maximization methodology". In fact, the Applicants are well versed in the work done by their contemporaries, have attended conferences, have read articles, have researched others' work, and have published their own articles and have never heard such use of the language as is being suggested in the Office Action to refer to the Applicants' "expectation maximization methodology". Accordingly, Woo cannot possibly teach the Applicants' claimed invention.

Moreover, the comment on page 4 of the Office Action about "the same field of endeavor of database management system, such as, searching, classifying data, weights and frequencies" suggests a possible misunderstanding of the terminology. Database systems store data and allow the user to change and search/retrieve them later. However, those skilled in the art would readily acknowledge that a packet filtering system, such as in Woo, makes decisions on each packet and

promptly forgets about them. Searching is only possible if data is stored. The “frequency” in Woo is the physical frequency, which refers to how many packets arrive in a period of time, while the “frequency” as used by the Applicants’ is the statistical frequency, such as how many times a word appears in a document.

In Woo, frequency is an operational requirement, while in the Applicants’ invention, frequency is one of the features used in the calculation. In a non-technical sense, all three systems can be loosely said to “classify data”. However, the Federal Circuit cautions not to read claims in a vacuum, but rather in the context of the specification. In re Marosi, 710 F.2d 799, 802 218 USPQ 289, 292 (Fed. Cir. 1983) (quoting In re Okuzawa, 537 F.2d 545, 548, 190 USPQ 464, 466 (CCPA 1976)). Thus, the Applicants’ claims must be in light of the language in the specification.

Pages 11-12 of the Office Action states that “Applicant argues that the prior art fails to disclose ‘the concept of collection’” and that “‘the concept of collection’ is not recited in the rejected claim(s).” However, the Applicants have never stated that they are claiming “the concept of collection.” Rather, this is being offered to prove that Woo and Palmer are non-analogous art. As indicated, generally, Woo makes a quick decision on packets as they arrive, with predefined rules; Palmer classifies all documents into categories and calculates similarities to be used later; while the Applicants’ invention classifies documents relative to a particular user query (and solely based on this). The result of the classification in both Palmer and the Applicants’ invention depends on what other documents are in the collection, while the concept of collection is absent from Woo. Because Woo fails to teach this, while Palmer does, it is highly indicative that Palmer and Woo are non-analogous. Woo uses weights not to make

decisions, but rather to choose decision makers (filters) so as to save time; the final decision should not depend on the weights if the invention in Woo is functionally correct and operable. Accordingly, the Applicants' invention provides a manner of weighing an output from the cascade of classifier layers according to a rate of success of query terms being matched by each layer of the cascade of classifier layers. Neither Palmer nor Woo teaches this.

Insofar as references may be combined to teach a particular invention, and the proposed combination of Palmer with Woo, case law establishes that, before any prior-art references may be validly combined for use in a prior-art 35 U.S.C. § 103(a) rejection, the individual references themselves or corresponding prior art must suggest that they be combined.

For example, in In re Sernaker, 217 USPQ 1, 6 (C.A.F.C. 1983), the court stated:

"[P]rior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings." Furthermore, the court in Uniroval, Inc. v. Rudkin-Wiley Corp., 5 USPQ 2d 1434 (C.A.F.C. 1988), stated, "[w]here prior-art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. . . . Something in the prior art must suggest the desirability and thus the obviousness of making the combination."

In the present application, the reason given to support the proposed combination is improper, and is not sufficient to selectively and gratuitously substitute parts of one reference for a part of another reference in order to try to meet, but failing nonetheless, the Applicant's novel claimed invention. Furthermore, the claimed invention, as amended, meets the above-cited tests for obviousness by including embodiments such as "retrieving documents from said database



based solely on whether said documents are relevant to said query” and “wherein each said feature vector is arranged only as a vector of counts for all features in a data point.” As such, all of the claims of this application are, therefore, clearly in condition for allowance, and it is respectfully requested that the Examiner pass these claims to allowance and issue.

As declared by the Federal Circuit:

In proceedings before the U.S. Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fritch, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992) citing In re Fine, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1988).

Here, the Examiner has not met the burden of establishing a prima facie case of obviousness. Page 13 of the Office Action suggests that the Examiner has met this burden. However, the Applicants respectfully disagree. Page 13 of the Office Action indicates that col. 1 and 2, lines 63-67, and 1-2, respectively of Woo provide the suggestion or motivation to combine the teachings of Woo with Palmer. However, the aforementioned passage in Woo merely states, “A more pragmatic approach is desired. In particular, it is [desirable] to be able to classify packets using a relatively large number of filters given the present state of packet arrival rates. Towards this end the invention seeks to provide a relatively efficient method and system for finding or identifying an applicable filter when a relatively large number of filters are employed in a packet [classification] system.” As previously, discussed Woo deals with packet filtering in network traffic while Palmer deals with text information extraction. Accordingly, Woo does not deal with extracting text information and there is nothing in the above language in Woo that suggests its teachings are meant to be combined with a system or method of text information

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extraction. Any reading of this into the above passage of Woo is unreasonably broad and is not something that one of ordinary skill in the art would partake in. Next, the Office Action states that Woo suggests a successful outcome of the combination [with Palmer]. Again, Woo seeks to provide a relatively efficient method and system for finding or identifying an applicable filter when a relatively large number of filters are employed in a packet classification system. Since Palmer does not deal with packet filtering, there is no reasonable basis to conclude that Woo is seeking to identify an applicable filter in a text extraction system or method. Next, the Office Action states that Palmer and Woo teach features that are directed to the same industry field. However, while some features may overlap, the totality of the subject matter disclosed in Palmer and Woo are from separate industry fields.

In fact, the USPTO in classifying Woo and Palmer has essentially determined that they are from non-analogous art fields. For example, the USPTO has classified Palmer in U.S. Classes 715/500; 715/501.1; 707/3; and 707/6. Conversely, the USPTO has classified Woo in U.S. Classes 707/100; 370/392; 370/389; and 370/401. Thus, one of ordinary skill in the art would not have been motivated to combine Palmer with Woo especially considering that the USPTO makes no suggestion of such a combination.

Accordingly, it is clear that, not only does Palmer fail to disclose all of the elements of the claims of the present invention, particularly, "retrieving documents from said database based solely on whether said documents are relevant to said query" and "wherein each said feature vector is arranged only as a vector of counts for all features in a data point," as discussed above, but also, if combined with Woo, fails to disclose these elements as well. The unique elements of the claimed invention are clearly an advance over the prior art.

The Federal Circuit also went on to state:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. . . . Here the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. Fritch at 1784-85, citing In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

Here, there is no suggestion that Palmer, alone or in combination with Woo teaches a method and structure containing all of the limitations of the claimed invention. Consequently, there is absent the "suggestion" or "objective teaching" that would have to be made before there could be established the legally requisite "prima facie case of obviousness."

In view of the foregoing, the Applicants respectfully submit that the cited prior art references of record do not teach or suggest the features defined by independent claims 1, 20, and 39 and as such, claims 1, 20, and 39 are patentable over Palmer in combination with Woo. Further, dependent claims 2-19, 21-38, and 40-57 are similarly patentable over Palmer in combination with Woo, not only by virtue of their dependency from patentable independent claims, respectively, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

## **II. Formal Matters and Conclusion**

In view of the foregoing, Applicants submit that claims 1-57, all the claims presently

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pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0441.

Respectfully submitted,

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